VINTAGE TECHNOLOGY

History of computers, video games, calculators, radio, TV & audio in the digital age Issue 6 - May 2008



Flight sims Flying with home computers

DefenderThe thinking man's shoot-'em up

Vintage electronics Will your collection still work after 100yrs?







Vintage Technology

WELCOME

This issue has much to offer those interested in educational history - including early educational software, vintage children's calculators and the Commodore PET.

Also inside is some great repair & care tips including how to preserve your collection from the ravages of time. Talking of which – if time's your thing, check out the section on LED clocks.

Don't forget to book 11th May into the diary for the UK's biggest vintage electrical event – the National Vintage Communications fair.

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Vintage technology: May 2008

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Can the mainframe survive?

So old-school uncool, the mainframe computer -- the workhorse of the IT world running the majority of today's global business transactions, the mission-critical platform of choice for virtually every member of the Global 2000 as well as local, state and federal governments -- is said to be going the way of other '60s artifacts like the vinyl LP.

Distributed client/server looks computing to be replacing the mainframe as the core of businessas they are offering traditional mainframe benefits like availability, scalability and server utilization. Although the mainframe's total cost ownership (TCO) continues to improve, the cost of software continues to be a major burden.

A MediaDev study reports that 44 percent of respondents claim that the mainframe costs are too high. Moreover, the rise of servers has eaten into mainframe sales. Worldwide server revenue increased 3.8 percent to US\$54.8 billion last year while mainframe sales

declined 12 percent to \$5.98 billion.

IBM dominates the mainframe market, but mainframes, account for a smaller slice of IBM's sales as the company moves to higher-profit technology services and software.

While there is no firm definition of a mainframe, the prevailing image conjures a room-filling computing behemoth with giant rotating tape reels and lots of flashing lights -- the "big iron" of popular lore.

The vast majority of large legacy (pre-client/server) mainframes currently deployed are IBM or IBM plug-compatible systems running MVS (now z/OS), DOS, VSE and os/390.

Bet on the mainframe, advises Bill Maclean, VP of ClearPath and AB Suite at Unisys Systems and Technology.

"Clients who do not look at the total cost of ownership will not understand the true economics mainframes versus alternatives....This comment extends to off-the-shelf application solutions that be appear to verv costeffective, until the client recognizes that thev must change their business to fit the application rather than adapt an application to the way in they which want to business."

Legacy applications still functioning well into the Internet era often present IT managers with unique sets of problems. Jack Burke is a business systems analyst with the San Bernardino County Human Services System (HSS). A bottleneck had resulted from the use of handwritten



timesheets turned in by workers in the HSS's Department of Aging and Adult Services. Payment is made bi-weekly through a legacy system called the "Case Management Information and Payrolling System" (CMIPS), supported by ancient Amdahl mainframes. Burke hardly believe his eyes when he first saw the operation in action: remote dumb terminals outputting volumes important documents to a noisy, obsolete dot matrix printer.

"It was like walking into a computer museum, only this is a 21st century working office environment,"

IBM has found one way to sidestep the mainframe vs. distributed computing dilemma by simply calling its mainframes something else.

Today, IBM refers to its larger processors as large servers and

processors as large servers and emphasizes that they can be used to serve distributed users and smaller servers in a computing network.

Brad Day, vice president and principal analyst at Forrester Research expects a "baby mainframe" to be available within six months at a lower price point. In the past, IBM has sold these stripped-down versions of the mainframe for

between \$150,000 and \$200,000.

There are now only about 10,000 mainframes left in the world, according to Reg Harbeck of CA in "Strategic Vendor Consolidation and the Future of the Mainframe," a 2006 white paper.

"Actually there have never been more," Harbeck noted, "yet that's been a large enough number to be the computing cornerstone of the world economy. The mainframe's not going away any time soon."

Batphone - The Legend of Zelda EP Review

Synthesized videogame music is quickly becoming a relic of the past. Compositions that were once limited by the restraints of CPU cycles and audio channels have been "liberated" by the processing power of modern machines which allow the expression of much more complicated arrangements. However, it was these very restraints which often empowered composers of gaming past to create some of its most memorable tunes. And few series can be considered the peer of Legend of Zelda when it comes to cherished music.

Batphone's Legend of Zelda album offers reinvigorated take on these Zelda classics by re-imagining those themes in a breakbeat style, through the use of an interesting mix of synthesizers. drums, piano, and bass guitar. The album contains a modest five tracks, which run about 2-3 minutes apiece, and spans most of the major Zelda games, such as the NES original, Ocarina of Time, and even the relatively recent **Twilight** Princess.

"Modder" turns hobby into career

If you ever thought it would be cool to have an Xbox laptop, or wished those old Atari games in your attic could be reborn on a retro handheld device, you might want to talk to Benjamin Heckendorn.

Better known as Ben Heck, the 32-year-old Wisconsin native has attained legendary status among "modders," hobbyists who tinker with video-game hardware to make it do things the original designers never intended.

Technology Web sites enthusiastically track Heckendorn's latest projects, which are marked by workmanship that makes the



finished products look they rolled off a factory line instead of a basement workbench.

Heckendorn got his start eight years ago when he decided to fool around with an old Atari 2600 -- the classic console that popularised home gaming when it launched in 1977 -- and ended up reincarnating it as a handheld device.

"I was shocked, I didn't think anyone would care about it but they did," Heckendorn said.

In fact, they cared so much they began offering Heckendorn hefty amounts of cash to transform their cherished game devices into one-of-a-kind collectibles.

"Ben Heck is basically the best. His mods are as professional as the stuff you can get at Best Buy. That's what makes him stand out from the other basement tinkerers," said Adam Frucci, a contributing editor to the popular tech blog Gizmodo, which has chronicled many of Heckendorn's creations.

Heckendorn keeps busy with a couple dozen projects each year, many updated on his Web site, www.benheck.com. Fees range from a few hundred dollars to convert a clunky old console into a handheld, to more than \$4,000 to make a laptop computer out of an Xbox 360.

There are plenty of bizarre requests, too.

"Often someone will ask me to combine five different video game systems in one box, which is of course ridiculous. One guy wanted me to build an Xbox 360 controller attached to his rowing machine at home so he could row and play 'Uno' with his friends online. It sounded so weird I did it."

An electronics hobbyist as a child and trained as a graphic designer, Heckendorn learned basic machining skills working for a sign-making business.

"I destroyed a lot of videogame consoles and burned my fingers a lot. Now I know which end of the soldering iron to hold," Heckendorn said.

Chatterbox Pub offers retro games

When one steps into Chatterbox it is hard to know whether it's a restaurant or a friend's basement. The main dining room was filled with retro couches, classic gaming systems, loud but not obnoxious music and waiters dressed like hipsters heading to a concert.

Chatterbox Pub offers more than just a meal, it offers an atmosphere that makes you want to stay long after you've devoured food from their delicious menu of gourmet sandwiches, pizza and burgers.

The restaurant's décor of colored walls, random pieces of art and fun lamps add to its relaxed mood, bringing

its relaxed mood, bringing the eccentric and classic together under one roof.

After dining one can take advantage of the full line of classic board games checkers such as Operation, Chatterbox offers free of charge to their customers. Customers can also rent classic console games (Sega, **Nintendo** and Atari) for a dollar or two per game.

If board games and gaming systems aren't enough, five widescreen televisions fill the bar and restaurant, broadcasting sports games and more.

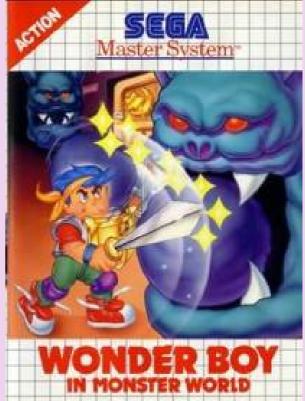
Overall, Chatterbox Pub offers a place to eat good



food. relive childhood infatuations with Nintendo and relax in an atmosphere that makes you want to stay "just five minutes longer." With its proximity to campus and its large variety of options, this restaurant is a must do for anyone looking for a unique dining experience complete with delicious food. Chatterbox Pub, 800 Cleveland Ave S, St. Paul, MN 55116

Master System games will go for \$4 on US Wii

Earlier this year, Sega announced that it would be bringing Sega Master System games to the Wii Virtual Console in Japan, Europe, and North America.



NEWS

Action platformer Wonder Boy and side-scrolling shoot-'em-up Fantasy Zone will comprise "the first wave of many" Master System releases for the Virtual Console, and cost-conscious gamers will be able to pick them up for as little as 400 Wii points (\$4).

Website aims to publish new Beeb games

website was launched recently for punters who fancy a go at creating software for vintage Acorn 8-bit hardware. RetroSoftware.co.uk was set up to give a helping hand to anyone who wants to take a nostalgic trip back to the days hacking together 6502 assembler code or wants to experience writing for 1980s microcomputer hardware for the first time. Beta testers. artists musicians. and illustrators and other contributors are also welcome to join in, we're told.

It's hoped the site will reach a



room.

A number of projects are already underway on the site: a software development environment geared towards 8-bit Acorn microcomputers by Steve O'Leary called SWIFT, and a 6502 CPU assembler by Rich Talbot-Watkins called BeebAsm.

A spokesman for the site said: "Some time less than a year ago, we started to notice that a number of talented 8-bit Acorn developer bods were gathering over in the stairwaytohell.com forums. Never one to miss a

machines, particularly the 8bit Acorn machines. As well as a forum to discuss with likeminded individuals, the site can provide you with hosting for your project and an army of volunteers to help with game play and platform testing, as artwork well and 28 distribution if you make it to a cassette and/or disc final release."

Polaroid pulls out of the instant film scene, leaving mournful devotees Snapped shut

Portland, the city of vinyl records and vintage clothes, is also a Polaroid city.

The ultra-hip Ace Hotel downtown decorates a room with Polaroids, floor to ceiling. Le Happy Restaurant papers its restrooms with Polaroids. The Stepping Stone Cafe displays Polaroids of diners who conquer a stack of their signature mammoth pancakes.

Young creatives, hipsters and artists dig the 60-year-old instant photography. They love that each photo is unique and tangible. Thev even rhapsodise over the technology's unpredictability, off-kilter colours and tendency to produce mistakes.



point where it can begin publishing users' software with proper disc releases and printed materials, just like the good old days when the Acorn Beeb ruled the classroom and fought against the ZX81 for a place in every British living bandwagon, a few pints later and it was decided the best thing to do was to exploit them all.

"Retrosoftware.co.uk is a community website designed to help people develop for old

"The imperfections and all the little things that can go wrong are what makes it exciting," savs Julia Blackburn, 30-year-old a fashion photographer, designer and Wieden+Kennedy art director. "And since you can't just push delete or circle images on a contact sheet, in the end you're always left sitting there with your pile of failed Polaroid photos."

But Polaroid last month announced that it is abandoning the instant-film business.

Even to generations raised on computers, Polaroids represent something reassuringly tangible.

"A digital photo exists in another dimension. It isn't real," says Norther Emily, a performance artist, musician and photographer who works a day job as a color consultant at a paint store. "A Polaroid is an actual object that you can interact with."

Even though people can print out digital photos, Jake Shivery, owner of Blue Moon Camera & Machine in St. Johns, points out that increasingly few bother.

"Culturally, we're really getting away from print," the Polaroid enthusiast says. "We look at photos on a computer screen."

That worries Ben Pink, 31, director of the Launchpad Gallery. "Any evidence you were ever there," he says, "is just fading away in the digital era."

As Polaroid itself fades away, Portland's instant-photo addicts are pondering their next snapshot. Lauderdale says he probably will switch to Fuji film for his daily photographic diary. Lauderdale, seldom without one of his many Polaroid cameras, replaced his written diary with Polaroid photos in 1996.

Mark Searcy, 33, the Portland Mercury's art director, will head for the highway. He plans a road trip through small towns across the country, looking for the last stocks of film -- "sort of like a Mad Max future for Polaroid" -- and taking Polaroid photos along the way.

Jeremy Pelley, 31, the art director who designed the Ace Hotel's room with his Polaroids, says he'll probably hoard some film.

'Beeb' creators reunite at museum

The creators of the BBC Micro are reuniting at the Science Museum in London to discuss the legacy of the computer known fondly as "the Beeb".

Hermann Hauser and Steve Furber, who worked at Acorn, will be joined by former BBC staff John Radcliffe and David Allen. The reunion has been organised by the Computer Conservation Society.

Dr Tilly Blyth, who is writing a book about the machine said: "The Beeb helped shape today's IT landscape."

The Beeb was released at the end of 1981 after the BBC had initiated a nationwide computer literacy programme. The corporation agreed to "sponsor" Acorn's computer following a hunt to find a machine which could help educate parents and children.

"The story of the BBC Micro is one of British innovation; it's about how one machine inspired a generation of youngsters to use computers," said Dr Blyth. "It created some of the industries we are strong in today - the new media industry, the computer games industry."

More than 1.5 million BBC computers were eventually sold; the BBC and Acorn had predicted they would sell 12,000.

The Science Museum plans an exhibition about the BBC Micro and its legacy in 2009.







Commodore PET computers

PET computers were, and still are, cherished for their futuristic and stylish design, their quirkiness and their originality.

In the days when home computers were either kits or generally required a lot of technical know-how to get anything useful done, it was the stuff of science fiction to see a self contained

computer which didn't require adding to it or building anything. The goal of the average person being able to do computer related stuff – like storing recipes, playing

games, learning maths and controlling the temperature of the home – was finally feasible.

Commodore Machines had bought out MOS Technologies who had earlier designed the Kim-1. Along with this corporate acquisition came Chuck Peddle who now came to work full time at Commodore. He persuaded Commodore to enter the computer market and was allowed to design their first



computer offering in 1977 – the Commodore PET 2001, which was built around the 6502 CPU designed by MOS.

The name PET officially stood for 'Personal Electronic Transactor' but may have also taken inspiration from the Pet Rock fad of the time.

For nearly \$600 the PET 2001-4 (4 K Ram) or 2001-8 (8K Ram) would have a built-in 9" monochrome monitor

displaying 40 25 characters on rows, built-in a cassette player, 73key calculator style 'chiclet' keyboard numeric with keypad, IEEE 488 port, parallel port, ''user port", cassette port inside the case and no **Basic** sound. version 1 (written by Microsoft) was built-in the ROM.

Add-ons included a speaker box (a 'Soundbox') to make sounds.

printer, disk drive, light pen, cassette player, plotter and digitiser.

The keyboard, although attractive to look at, was fairly awkward to use. Later PET models dropped this keyboard in favour of a larger normal keyboard which also meant the built-in cassette player was dropped as there was no room for it next to the keyboard. The tops of the keyboard in the original PETs were susceptible





VINTAGE COMPUTING

to being scratched off.

Capital letters were the default, but the user could type in a POKE command to get small letters instead (and use the Shift key to get capitals whenever needed).

Later 2001 models, in addition to the better keyboard, also had more memory (16K, or 32K Ram). just like a car. A lot of manuals encouraged users to tinker with the inside e.g to reseat RAM chips or upgrade the memory.

The PET faced a lot of competition from the Apple II and Atari 400/800 computers, which had superior sound and graphics. Where it scored over rivals in particular, was its

there from a Dutch company. The 4000 series had larger monitors and more standard memory.

The CBM 8000 series after this introduced an 80 character x 25-row screen but this wasn't very compatible with earlier software and so wasn't very popular.

Next came the SP9000 or

SuperPET which added a second CPU in the form of the Motorola 6809 and included number programming languages BASIC including in ROM for the 6502 and APL, COBOL. FORTRAN, Pascal and a 6809 assembler on floppies for the 6809.

In the early 1980s Commodore introduced the CBM-II series (also known as the B or 700 series and P or 500 series) but these were not as successful. However the original PET machines were revived and the CBM-II case style was retained. These were known

as the SK's (due to the separated keyboard). They also had a swivel monitor.

A PET computer in a collection or a museum will attract the attention of visitors. People will be drawn to it's homely, retro look and will immediately want to start using it.



A plethora of books, magazines and home grown and commercial software was produced as more and more PETs sold and in this respect it was very well supported.

The PET was very similar to a car – the case was made from sheet metal as opposed to plastic and the 'hood' or case could be opened and propped up with the metal stick inside,

popularity in schools. It was made from a simple all-in-one design and was sturdily built. The IEEE 488 port made it especially useful to network other PETs, which could share printers and disk drives.

After the 2001 series of PETs Commodore introduced the 3000 and 4000 series but renamed the PET to CBM in Europe as there was already a machine called PET for sale





Old-school computer learning



Educational software (past and present) can be divided up into those for preschool children, school age children, industry training (e.g. flight simulators) and general learning for all ages (e.g. language software). The following focuses on the first two categories.

Anyone of school age in the late 70s /early 80s probably had exposure to either a BBC, Spectrum, Commodore PET, TRS-80 or an Apple II at their

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school, and while these computers were educational in themselves, they also needed the right kind of software so children could get as much out of them as possible.

This was especially SO because there would only usually be one computer per school or for the lucky ones, per class, and SO children would not have been able to spend When computers were first mass-produced for consumers, one of their main uses was seen to be that of educating and teaching children. Did the available educational software allow them to measure up to this task?

much time on them unless that school had an out-of-school 'computer club' or similar. Most educational software at

this time seemed to be for these micros with there being hardly anything on offer for the lesser-known brands. The BBC and PET computers were especially popular with schools because of their rugged durable design. Apple also offered discounts to educators for its computers.

For the preschoolers, software usually focused on the ABCs/basic numbers, shapes, colours and the like.

This was an easy task for programmers of 8-bit machines as they were not generally memory-hungry. Also it was usually only necessary to have simple graphics and text for this age group.

It seemed however that it was hard to justify the price of a normal game though, for such simple programs.

They would translate well on today's computers but with a big difference – the slowness of interactivity and loading up speed. It would have been difficult for a young child to sit still and wait not only for cassette-based games to load up but for progression within the games themselves.

Some games for this age level (as for older children), made use of popular TV or other characters (e.g. Donald Duck).

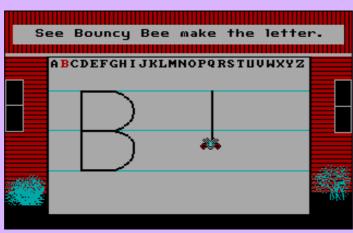
These games would use the concepts of hide and seek, memory, sometimes digitised speech (e.g. Big Bird's Hide and Speak for the NES), 'painting' with the computer's colours, matching, sequencing,



guessing and simple problem solving.

The next category of software for older children, could be divided up into strictly academic, concentrating on key learning skills that would complement school learning,

and edutainment software which would be used more by children at home and involve more game playing than academic skills. There is another category – namely games in general which indirectly provide a learning experience but



their original intention was to provide fun.

Looking at the first category, perhaps the oldest educational



software was the Logo language which was created in 1967 to teach mathematical concepts to children. This led to a virtual graphical turtle, followed by the physical floor robot turtle which at first was attached by wires and then remotely controlled. The most widely used implementation of Logo was Apple Logo for the Apple II computer. The user got the turtle to draw line pictures using simple commands.

The most popular software (with teachers anyway), were those that tied into the curriculum and re-inforced concepts that were taught in the classroom.



Software for this age group would often have a game element which had been taken from other non-learning games, for instance mazes, shooting aliens and participating in an adventure game with puzzles to solve (eg

Adventures Math for the IBM). Many had option the of chosing difficulty level. One of the most popular such games in the UK was the Granny's Garden adventure game from 1983 which was used widely

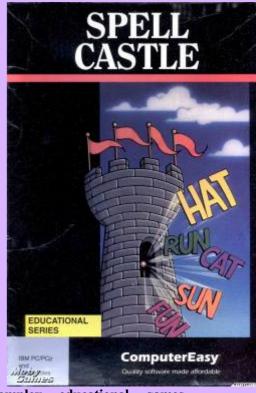
in schools.

In the USA one of the first edutainment games was 'Where in the World Carmen Sandiego' created by Broderbund Software, which was very popular with parents and teachers. The object was to together geographical and historical clues in order to track Carmen Sandiego, an international iewel thief travelling through time and around the world. This led to other successful titles being produced, such as the 'Kid Pix' drawing and painting program.

One of the most popular educational software companies in the USA was MECC based in Minnesota. Their first game. The Oregon Trail, which had its roots as a mainframe text game in the 1970s, was about travelling to Oregon in the days of the 19th century pioneers. Children would learn about planning, logistics, problem solving and history among other things, as they guided their wagon of pioneers along the trail.

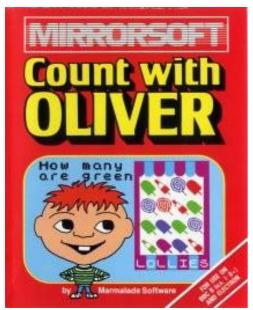
MECC went on to produce many successful titles (such as Number Munchers and Lemonade Stand), which were used widely in schools in the USA.

As computers attained bigger memories and processessing power, the programs ranging. more wide For instance, instead of just having a game to teach counting, there may also be other games on the disk or CD eg telling the time. With the advent of Windows and CD Roms, educational software seemed to move away from younger children and focus on older children who would be better able to be involved in immersive and



complex educational games. The 2005 game 'Biology' is a strategy game where the player has to renaturate desolated landscapes by directing a task force of scientists. The game mixes real-time 3D strategy with a lot of special exercises in biology.

An unusual early game was Car Builder from 1982, which allowed the player to design and build a true-to-life car. In this respect allowing children to design or create something and then test it out was a clear advantage of having a computer in the classroom.



Also unusual was the Drug Watch game in the UK from 1985 where you played the part of a novice teenager who had to shoot away drug pushers by firing the word 'No' at them!

Donald Duck's Playground from 1984 won many educational awards as it was very good at teaching money concepts. In the game you control Donald who has to work to earn money doing various tasks, so that he can buy a playground for his nephews.

Some software was originally intended to be purely a game but ended up being used for educational purposes — for instance the Civilization games from 1991. The 90s was also the time of reference software, such as Microsoft Encarta encyclopedia, which were educational.

With higher performing computers, software now is

able to broaden its educational remit and offer a more fuller multimedia experience. More wide ranging subjects are being covered now so we have gone from just maths and English teaching to other subjects like history, science, engineering, and financial management.

It seems that in all cases, the instant feedback and level of personal control of progression offered by a computer was the main advantage that software had over traditional classroom teaching and in the past as in the present, educational software will always have a place in helping children to learn.

Vintage technology events

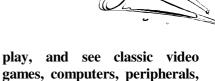


May 4th, 2008 Reading, PA, USA: Too Many Games (TMG) convention http://toomanygames.com/

May 11th, 2008 Leamington Spa, UK: National Vintage Communications fair. Features early radios, TVs, gramophones, telephones, valve hi-fi and other electrical collectibles. Over 200 stallholders present. This appears to be the biggest vintage electrical event in the UK and is held annually. http://www.nvcf.org.uk

May 15th, 2008 London, UK: Seminar on Elliott computers at the Science Museum. http://www.computerconservat ionsociety.org/lecture.htm

May 24th, 2008 Fairview Park, OH, USA: The Classic Computing and Gaming Show. Buy, sell, trade,



games, computers, peripherals, memorabilia, and more. http://www.ccagshow.com/

June 20th, 2008 London, UK: Study Day at the BT Archives. See vintage telecom related film and have exclusive access to the Search Room. Organised by the Telecommunications Heritage Group www.thg.org.uk

June 28th-29th, 2008

Kentucky, USA: 3rd annual C4

Expo organised by the Cincinnati Commodore Computer Club.

www.c4expo.org

Early modems in the US & UK

It seems easier to find vintage modems and associated software in the US because not only did the US take the lead during early modem development but also more people there bought them.

Modems (of a sort) had been used since the 1920s in early news wire services. In the 1950s modems were used by the military and then the airline industry to manage tickets and scheduling, and then in 1958 AT&T introduced a 200-baud modem or 'digital subset' as they were called. Later, modems were called 'line-adapters' or 'data-sets'.

In 1962 the 201A and 201B Data-Phones were introduced, which were synchronous and half-duplex and full duplex respectively. The full-duplex 103A modem was also introduced by the Bell phone company and provided full duplex at 300 baud. This used frequency-shift keying (FSK) in that the call originator transmitted at 1070 or 1270 Hz answering modem transmitted 2025 at 2225 Hz. The later Bell 212 could reach speeds of 1200 bits per second and used phaseshift keying (PSK) which was an improvement on FSK. The AT&T 113D modem was 'originate-only' their 113B/C was 'answer-only'.

this At time there were with transmitting data at faster rates along the phone lines as data could be lost or garbled en route as there was no data control mechnanism on the lines. An automatic adaptive equalizer was invented by Bell in 1965 which enabled data to be sent at faster speeds with less human intervention.

Modems in the '60s and '70s were mostly acoustic couplers

in that they converted the digital bits of data to analogue frequencies which could be sent along a phone line via the handset. phone **Numbers** would be dialled using telephone and when computer tone was heard, the handset of the phone was pushed into the acoustic cups of the modem. The modem would have a switch on it to indicate whether it was to originate or answer a call, and this was done manually at first.

advantage of The main acoustic couplers was that they were very portable and could be used anywhere that there The disadvantages included that of the couplers being susceptible to external noise, which could prevent a good connection, poor speakers or microphones inside them and the fact that these could both wear out after a lot of use. Cross talk on the line was the reason many countries banned the used of couplers.

In the early 70s some computer operators made use of 'baseband signalling' for local transmissions instead of using a modem. Pulses coming from a terminal were fed directly into a pair of transmission wires. The signals could not be transmitted too far or too fast – usually under a three-mile range - and at a speed of up to 300bps.

In the late 70s consumer modems of usually 300-baud speed were produced for home computers. At a cost of between \$300 and \$400, these

weren't cheap, but still considerably cheaper than the average modem price in the UK of over £1000.

The early 80s brought faster modem speeds of 9.6 then 14.4 kilobits per second (although home computer modems generally stayed at 300 bps), and featured echo cancellation, error correction codes and fallback which allowed faster modems to communicate with slower modems.

There was lack of standardisation and compatibilty between different hardware at this time. For instance Europe used CCITT V21 standard and the US used Bell 103 standard. Additionally newer landline phones couldn't fit on to standard acoustic couplers, (although some couplers had a flexible link between the cups so that the coupler could be bent to fit the phone handset).

After the American company, Hayes, sold it's first home computer modem in 1977, it developed the Hayes modem command set which quickly became an industry standard. With the introduction of the Smartmodem in 1981, home computer communications took off on a much larger scale.

The Smartmodem enabled the computer to dial automatically and make use of terminal emulator programs to simplify communications. In 1984 a plug-in board Smartmodem was available as were other internal modems. The



IDEAComm 1200 card modem, which cost \$545, was full duplex, and had automatic dialling and automatic answer features. The manual was 75 pages long so it probably would not have been a 2-minute job to set up!

Many other standards were also introduced for special purposes, e.g using a highspeed channel for receiving, and a lower-speed channel for sending. One typical example was used in the French Minitel system, where users' terminals spent the majority of the time information. receiving modem in the Minitel terminal thus operated at 1200 bit/s for reception, and 75 bit/s for sending commands back to the servers. The Prism VTX 5000 modem for ZX **Spectrum** which gave access to the Micronet 800 database on Prestel also received at 1,200 baud transmitted at 75 baud.

Telebit introduced Trailblazer modem in 1984, which used a large number of 36 bit/s channels to send data one-way at rates up to 18,400 bit/s. A single additional channel the in reverse direction allowed the modems to communicate the size of data waiting at either end of the link, and so the modems could change direction on the fly.

In the UK consumers did not have many choices if they wanted to hook their computer up to the phone line. Although prices had come down to around £200 for a modem. hard wired modems at this time could introduce abnormal voltages or signals in the phone system and so few were approved for use by micro owners. Only the Torch and **TRS80** Model Ш the computers had built-in modems that plugged directly

into the phone lines.

Until October 1983 no one other than BT (British Telecom) could approve equipment that could be attached to the public phone lines, and this monopoly did not encourage BT to make low priced modems.

Then the British
Approvals Board for
Telecommunications
(BABT) was set up at the
UK government's

instigation (of which BT was the parent company) to test other commercial modems for approval. There was a massive backlog of new modems awaiting approval and it was a very slow process.

Those that were approved were marked with a green dot, or else marked with a red dot if not. The first few modems were rejected because the BABT they said that the modem plug sockets were dangerous for small children who could stick their fingers in them, but they didn't realise that BT were using these same sockets to update all the domestic phone installations! So eventually BABT had to approve these new BT-style sockets.

The BABT equivalent in the USA – the FCC, - also approved modems by checking the modem tones emitted were





correct and that no stray tones were generated which might confuse the phone company equipment, but their approval process was much quicker.

To get around these restrictions in the UK. low cost third party modems were marketed, as it was only illegal to use unapproved modems, not actually sell them. The first of these modems was the £99 modem by Minor Miracles which operated on both UK and US phone frequencies. This modem had not received BABT approval, but was being sold in the anticipation that they would receive approval at a later date and that the company would not be responsible for any consequences of the buyer using the modem.

anv case it was expensive to install a modem in the home in the UK at this time. For a hard-wired modem BT had to install a Series 600 or 95A socket next to the existing phone connection which would have cost £25 to install. in addition to quarterly rental charge. Micronet, however, used to offer free fitting of the sockets in some of its subscription offers.

In the US it was cheaper. Twoin-one phone line socket adaptors were available for \$10 and didn't need anyone to come and install them. Micro users could also unscrew the ear and mouthpiece of the phone handset and attach the modem wires directly in parallel to the wires which were attached to the microphone and loudspeaker in the handset.

A popular modem was the Commodore 1650 Automodem for Commodore computers. It was a bit more manual and required the user to press a switch on it for either 'data' or 'telephone', a switch for full or half duplex and an 'answer/originate' switch. Other non-commodore modems needed an interface to connect to the Commodore.

Some modems had an auto dial feature if the phone line was engaged. In the UK some modems waited a full minute before redialling after an engaged tone, so it was often quicker to redial manually.

Modem speeds in the 90s got ever faster going from 14.4 kilobits per second in 1991, to 28.8 kbps in 1994, to 33.6 kbps and then 56 Kbps.

Online communities and BBSs flourished where and whenever the hardware allowed this to happen. Whilst the UK lead the charge for teletext services and allowed people there to use their TVs for something other than program watching, people in the US had the chance to get their micros to go beyond the boundaries of the home.





Vintage Tomy handheld electronic games

No '80s childhood would have been complete without a Tomy handheld game. Whether you only had a wind-up game or a more expensive 3D LCD game, you would have had hours of fun.



Tomy, founded in the 1920s in Japan, has had a long history of producing battery-operated toys. Starting with the Bubble Blowing Elephant in 1956 it is still producing successful and popular electronic toys.

In the mid 1970s they produced mechanical handheld games — including the 'pocketeers' range of games - which used wind-up timers, levers, springs and ball bearings. Some games used water — by pressing certain buttons, jets of water would move objects to certain

positions.

These games progressed in the late 70s into the battery operated electro-mechanical kind, which used LED lights along with the mechanical parts. Such games included 'Blip', which was based on Pong, 'Hit and Missile' and 'Digital Derby'.

LCD and **VFD** (vacuum fluorescent display) games followed these. VFD games usually took 4 x C batteries and were produced in the early '80s. VFD games included 'Alien Chase' which could be played by 2 people at the same time and the popular 'Caveman' game, which came in different variants. At this time many games were clones of popular arcade games such as 'Galaxian', which actually was an unusual pinball game, 'Kingman' - based on Donkey Kong, 'Astro Blaster' based on Scramble and 'Pac Man'. Tomy also produced some

tabletop games in the style of stand-up arcade games.

Most of the LCD games were produced in the early 80s and either took 3 x AA size batteries or the smaller LR44 button size batteries. The LED games were produced in the late70s/early 80s.

The games were of the usual kind of this era, namely, space/alien shooters, racing games, sports games like volleyball and bowling, and arcade game clones. However there were a lot of original themed games, in particular the Hello Kitty games licensed from Sanrio.

Tomy was also the only company to obtain a license to make a Tron handheld game (after the Disney film). The outer case was made of a smoked clear plastic so the inside of the game could be





seen.



Tron and some other Tomy games were released by Grandstand in the U.K. Tomy also licensed games to be sold

under the Tandy Radio Shack name.

One of their most innovative handheld games was the 3D LCD line of games. These games looked like binoculars and the games were played by holding the game up to your eyes to look through to the screen. Control buttons were positioned on the top of the game. Graphics looked like they were colour VFD or LCD but actually it was just a black and white LCD display which used light and colour filters to produce the coloured images. Natural light had to come in through a panel on the top of the unit to enable the images to be seen, so they couldn't be played in a dark room. The best known of these games were the Shark Attack, Sky

Attack, Sky Duel and Thundering Turbo.

Some of these games also had stereo sound which made game play more realistic as the speakers were held close to the player's ears.

One of the most interesting games was the backlit LCD or 'CLCD' series of games. The screens were very attractive to look at and play on. Titles included 'Monster Burger', 'Mr Do!' and 'Wheelie Crosser'.

Tomy electronic games were wide-ranging and appealed to all ages and tastes. They were fun, sometimes very original and today make great collector's items. ■

Interview with Richard Hanson, founder of the popular Superior Software company

Superior Software produced some of the most popular home computer games of the early to mid 1980s, including such titles as the Repton series, Tempest, Citadel, Karate Combat, Thrust, Galaforce, Ravenskull, Stryker's Run and Crazee Rider.

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How did you first get involved with computers and software?

From my youth I've been interested in mathematics and computers, and I decided to take

me computers were just starting to become available at that time. They were relatively expensive and very limited by today's standards. I gradually became more interested in computers, and switched degree course in my first-year at university to a B.Sc. in Computational Science. While I was at university I bought my first home computer, an Acorn Atom. I wrote some games and other software for the Acorn Atom using Basic and a 6502 assembler, and 17 of my games and utilities were published by a Leeds-based software publisher called Program Power, which subsequently became known as Micro Power. Later I bought one of the first BBC Micros and wrote some games and utility software for that computer.

When did you form Superior Software, and what made you decide to get into the business?

I formed Superior Software in the summer of 1982 after completing my degree, and my business partner another graduate, John Dyson, who worked for the BBC in Leeds. I decided to set up in business because the software that I'd written for Micro Power had been commercially successful, and I felt confident that I would be able to manage the other aspects involved in running the business.

How did you go about setting up Superior Software and getting games for the new company? What was the initial reaction when Superior Software emerged into the BBC Micro marketplace?

Superior Software's first four games were published in the autumn of 1982; I wrote three of those games, and John Dyson wrote the other one. We set up Superior Software with just £100 - John and I each put £50 into a company bank account; and we placed a small black-and-white advertisement in one of the early home computer magazines - I think our first advertisement appeared in a magazine called Computing Today. All of our initial software was sold on cassette because very few BBC Micro owners had disk drives in those days. We received a very good response to our first advertisement, and the software sales which it generated covered

Around the World in 40 Screens

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the cost of the advertisement several times over. We started to place larger advertisements in a few magazines, and invited other programmers to send their software to us for evaluation and possible marketing by us.

In the early days, who were your main competitors? How did you get on with your competitors?

Our main competitors in the early days were Acornsoft and Micro Power, and both of those produced companies some technically accomplished games. Another software publisher that came on the scene with some very good games was a company called Software Invasion. Those four companies pushed against the technical capabilities of the BBC Micro, and each company would regularly bring out new landmark games. I didn't see very much of the Acornsoft management at that time, but I occasionally met the Software Micro Power and **Invasion** management, and everything was quite convivial. Although the four companies were in competition, we didn't abuse the professional relationships.

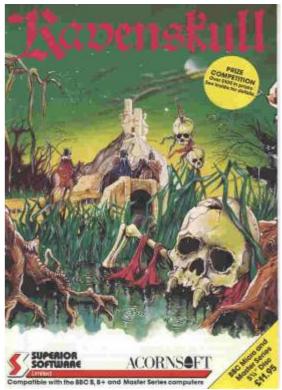
When was it that you first realised how popular Superior Software was?

Well, from the beginning I'm pleased to say that we've received many complimentary letters from customers and it soon became clear that people appreciated our software. All the same it was good to see that confirmed by the software charts. Gallup produced a weekly software chart, and one memorable week in January 1987 Superior Software's games were placed at positions 1, 2, 3 and 9 in the BBC Micro software chart; the top slot was filled by Repton 3, which held the number 1 position for 12 weeks, finally being overtaken by Ravenskull.

In 1986 Superior Software obtained the rights to republish some of Acornsoft games. With

hindsight do you wish you had published Elite originally?

Acorn Computers approached Superior Software and some other software companies in 1986 because Acorn largely wanted to concentrate its activities on hardware rather than software. The Acornsoft label and software were worth obtaining for two main reasons: (a) Acornsoft and **Acorn Computers were implicitly** associated with the BBC Micro as manufacturers of the computer, and (b) Acornsoft had produced some very good software such as Elite, Revs, and some of their early games.



Regarding David Braben and Ian Bell, the co-authors of Elite: I would have been delighted to have published Elite when it first appeared in 1984. However, at that stage Superior Software had not risen to great prominence, so understandably David and Ian did not originally offer the game to us. I was pleased to republish Elite under the joint Superior Software / Acornsoft label in 1986, and we achieved good sales figures for the game in its rereleased form.

INTERVIEW

How many games and other software titles have Superior Software published in total?

We've published over 100 games and utilities of our own, and we've republished about 40 of the best games originally published by other companies.

What have been Superior



Software's top-selling titles?

The Repton range of games has been the biggest selling series for us. There were seven BBC Micro titles in the Repton series, and the cumulative sales are over 125,000 units. I think Repton is the kind of game that appeals to many people who would not usually play computer games; it's a brainteaser rather than being one of those games that just require dexterity and quick reactions. Away from games, our softwarebased speech synthesiser called SPEECH! was a big success, and technical rewarding accomplishment for us. It also gave us our first major television SPEECH! exposure, when received a glowing review by Fred Harris on BBC TV's Saturday Superstore programme. There were about 50 other titles which achieved good sales including Elite. figures. Overdrive, Tempest, Citadel,

Karate Combat, Thrust, Galaforce, Ravenskull, Stryker's Run, Crazee Rider, The Last Ninja, Predator, Ballistix, Sim City, Revs, Quest, Spycat, Exile, Superior Soccer, Ricochet, and Perplexity.

Many of the games, including Exile, had prize competitions for players who completed challenges in the games. Whose idea was it to have prize competitions associated with some of Superior Software's games, and were those prizes always awarded?

That was one of Chris Payne's promotional ideas. Some of the prizes were quite substantial; for example, a £500 sports moped was the first prize in our Crazee Rider game; and I'm sure the prize competition a very worthwhile promotional feature for our major games. Yes, we always awarded the prizes that we described, and we were careful to deter cheating by using mechanisms such as encoding messages within the games.

What is your favourite Superior Software game?

It is definitely one of the Repton games, although it's hard to say which one I prefer. If I

have to choose just one, I'll go for Repton 3.

Do you still own and play any of the old Superior Software games?

I think I have all of our published games, plus a few that didn't make it to publication. I occasionally play some of the old games, particularly when friends ask to see the games.

Do you long for the Superior Software days of old, or just want to forget them?

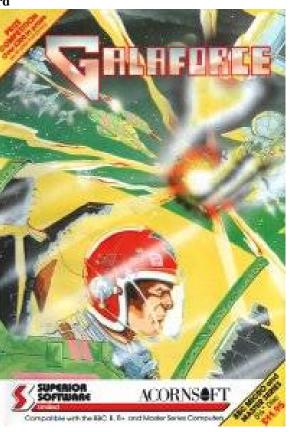
Those days were often enjoyable, and sometimes very challenging as well. I'm happy with the software we published: some of our games continue to be played today, and I think Elite, Exile and Repton will still be enjoyed in 100 years' time. While I'm sure I'll never forget some of the significant moments, I'm now looking forward to new challenges.

How do you think the software games industry has changed since Superior Software's heyday?

Clearly the graphics, sound and processing capabilities of the computers and consoles have increased by leaps and bounds, although the games themselves are not necessarily more enjoyable or challenging purely because of that.

There are definitely some very good new games around, but many games seem to be reworked versions of old ideas. Considerably more money is often spent on the development and marketing of new games nowadays.

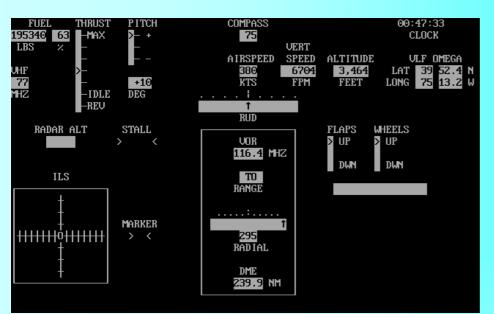
By Crispin Boylan ■





Flying with home computers

It is interesting to see how the flight simulator genre of games have developed since their beginning and to see what effect better computing power and graphics have had on game play and entertainment.



Flight sim games, from the start, have generally fallen into the category of straightforward learning-to-fly/pilot sim, fighter pilot/shoot-em up games or space/alien shoot 'em-up.

The first flight simulators were very hampered by the limited computer power of early microcomputers and left a lot to the imagination of the player.

One of the earliest flight sim games was the B-1 Nuclear Bomber game for home micros in 1980. It was really a turn-based strategy game where the player had to input commands in response to external events as there was no graphics. There were also only 12 commands so it was very basic.

The 747 game for the Atom computer only had 12K of RAM but was intended to be a true to life simulation of flying a 747.

The first successful flight simulator which was designed

from the outset to be as true to life as possible (in spite of the limitations of home micros then) were the games developed by subLOGIC, starting with Flight Simulator version 1 in 1979 which ran on the Apple II and TRS-80.

Early '80s flight sims were very basic visually - lines, basic shapes and numbers used sometimes being represent scenery and usually with either a 1,2 or 3-colour background. This was still an improvement on the prior textonly flight sims. Cockpit displays would have had up to 15 different readouts and controls.

In 1982 subLOGIC licensed the IBM PC version to Microsoft and this started the very successful Microsoft Flight Simulator series of games.

Flight Simulator version 1 was the most advanced game at this time, having around 20 cockpit readouts and controls, more scenery and cockpit colours and variable weather conditions. The scenery detail was still very simple – a blue sky and green land with simple shapes or lines to represent any ground features.

Some flight sims at this time, particularly for less powerful home computers, only showed the outside of the cockpit during take-off and landing. The Jetset game for the ZX Spectrum and Jumbo game for **BBC** had minimal the graphics, but were still fairly realistic simulations of flying an aeroplane. Some used the pretext of flying at night to get with showing graphics such as Nightflite for

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YOU ARE FLYING A B1 BOMBER OUT OF THULE AFB. YOU ARE IN AN ALERT STATUS ORBITING OVER THE ARCTIC STATUS HOT WAR HOT WAR HOT WAR HOT WAR YOUR PRIMARY TARGET IS SVERDLOVSK. YOUR FAIL SAFE CODE IS MAINE.

YOUR ALTERNATES ARE:

ARKHANGELSK ASTRAKHAN' KIYEV
LENINGRAD MOSKVA
```

the ZX Spectrum.

If there was to be any story line or extra action to the basic flying, then usually a game would feature shooting enemy aircraft or bombing enemy installations, and the player would assume the role of a pilot. Occasionally there were more lighthearted exceptions namely 'Solo Flight' by **MicroProse** Software, where the player would have to deliver bags of mail to various towns, or the **Blue Angels Formation Flight** Simulation from 1989 where the player had to perform

SubLOGI C's Flight **Simulator** II for the Amiga, Atari ST & Macintosh (which was on a par with the Microsoft FS verson 3), was the first to use windows to

get multiple 3D views, mouse control and modem play in the game.

With

3D views, mouse improved graphics in flight sim

OWER PROPERTY OF THE PRINCE OF

aerobatics.

In 1983 flight simulators got a bit more serious, especially with the launch subLOGIC's Flight Simulator II. This was aimed not only at players but trainee games pilots. **Players** were encouraged to buy real flight training manuals navigation charts to help them understand the game controls. It was also the first time that players could load up extra scenery add-on files.

The mid '80s introduced the concepts of viewing the plane from different perspectives, replaying flight maneouvers. practice and flight flying different aircraft. The Tomahawk game for the ZX Spectrum involved flying an attack helicopter.

memory and processing flight power, simulations were essentially the similar same controls, objectives and gameplay, but with elaborations on the basics. For instance instead of flying just one

more

plane, it was possible to fly many types of plane in the same game because there was simply more memory available.

Chuck Yeager's Advanced Flight Trainer enabled the player to test pilot 14 different planes.

Obviously screen imagery was more detailed, for example there were over 30 readouts/controls now visible on screen and also with 3D cockpit views.

improved graphics in flight sim games, better audio and additional game features such as air traffic control communication (as in Flight Assignment: Airline Transport Pilot), custom cockpits (Flight Simulator version 5), better weather effects and larger areas to fly to.

We now have Microsoft Flight Simulator X which allows the player to fly over the whole world, use real world weather data and fly various aircraft on a variety of missions.

It seems however, that with flight sims past and present, the more realistic they are, the harder they are to play. Budding pilots can learn a lot not just from the latest sim game, but from the humble 8-bit game varieties (which hopefully didn't put too many people off from becoming real pilots!).

In 1989,
Microsoft's
fourth Flight
Simluator
version allowed
users to design
their own
aircraft for the
first time.

In the '90s there were of course





Defender – the thinking man's arcade shootem up

Defender is still worshipped by dedicated (sometimes bordering on obsessive) fans.

Defender, created by Williams Electronics in 1980, was slow to catch on at the very start. People were intrigued by the 5 buttons plus 1 joystick (which only moved up and down) controls, and also perhaps wary of playing it because it was perceived as too complicated.

The player, controlling a space ship flying along a horizontally scrolling landscape, had to defend the planet from hoards aliens and rescue humanoids from the Lander aliens who tried to abduct them from the ground. It was the first time that a wraparound landscape was used in an arcade game - so flying constantly in one direction would bring you to where you started from.

The player's ship was equipped with laser fire, three

smart bombs which eliminated every alien the screen, and hyperspace. A radar screen showed anv aliens humanoids in the vicinity.

Aliens consisted of Landers which try to capture Humanoids (if they reach the of the screen the Humanoid turns into Mutant), Mutants - which are more difficult to shoot and more dangerous to the player, Baiters - difficult to shoot and they home in on the player if too much time is taken to complete a level, Bombers which leave staionary mines in the air, Pods – which burst into Swarmers when shot and

Swarmers which move quickly and are harder to shoot.

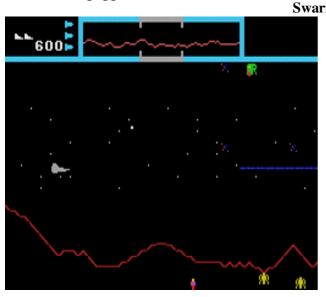
If the player kills all the aliens, they progress to the next level. If all the Humanoids are killed the planet explodes and the player has to shoot loads of Mutants

"I plopped my quarter in and hit the start button. My first man lasted maybe five seconds, before I flew into a lander. The second man was blown away seconds after materializing when I didn't get moving soon enough paid for it. The last man lasted about as long as the first. This time I hyperspaced and blew up on re-entry. All told my first game of Defender lasted maybe twenty seconds from insertion of quarter to GAME OVER screen. I was hooked. I played Defender every day."

in space until the planet is restored after five waves of aliens.

The controls consisted of an up/down joystick, and buttons for thrust, hyperspace, reverse, smart bomb and fire. The hyperspace button was very awkwardly positioned and players would sometimes ask others to help press it in the middle of a game when needed.

Devoted fans probably don't need playing tips, so they can skip this next bit. If you need







some help though, look at the following:

- Avoid using hyperspace unless you are about to die.
- Use reverse when in a tricky spot and run away from trouble if you need to you can always fly back towards the aliens and shoot them when ready.
- Don't try to outrun Baiters – use reverse and then fly back and shoot them.
- Fly behind Swarmers and shoot them – they can't shoot behind themselves.

There were some software bugs in the game which caused it to slow down or stop or not register when certain control buttons were pressed but usually these weren't obvious until the higher levels had been reached when there was more action on the screen, thus consuming more processor resources.

Defender was designed and programmed by ex-Atari employee Eugene Jarvis, with the help of Larry DeMar, Sam Dicker, and Paul Dussault. Eugene was given the task of leading Williams Electronics into the new video game market with this game and had only an 8 month time frame to complete it as it was scheduled to be shown at the Amusement **Machine Operators of America** (AMOA) trade show. On the day of the trade show, there were a few hiccoughs with starting the game and it was believed that, along with

Midway's Pac Man, it would not be a success. The following year, in 1981, the AMOA declared Defender the number 1 game. More than 60,000 Defender arcade game machines were sold over the next few years proving that it was a very successful game contrary to earlier predictions.

Jarvis left Williams soon after, and with DeMar formed the videogame design company Vid Kidz which produced the Defender sequel Stargate (later renamed Defender II for legal reasons).

There were many Defender clones remakes, both soon and after it's debut and in recent years.

Many were for popular 8-bit home computers such as Orbiter, Dropzone, Datastorm, Star Ray, Guardian, Eliminator, Planetoid, Chopper Command and Planet Raiders.

These games were fairly good but lacked the multiple buttons (in particular the reverse button) needed to fully use all the gameplay strategies possible.

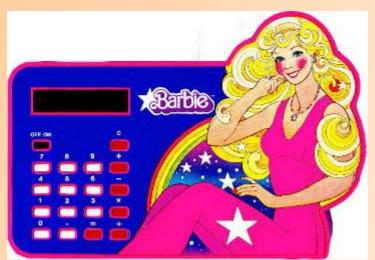
For collectors it is pretty easy to find an original Defender cabinet as the game was so popular. It is a challenging game but nonetheless enjoyable to play both for the strategy and the sound and graphics effects.





Learn about maths the vintage way...

Kids calculators weren't just scaled down colourful versions of 'proper' calculators, but useful learning toys that could be used today.



Children's calculators started to appear from around 1972 and in the 70s had mainly LED displays and ran on a single 9V battery. LCD display calculators were then the norm in the 1980s.

Some of the calculators were brightly coloured with large or different colour keys. Others were shaped in the form of a popular character or had a picture of a popular icon on the front, for instance the Concept 2000 Barbie calculator or the Tandy Mickey Mouse calculator.

Some children's calculators had some basic games (usually maths q & a's) that could be played in addition to using the calculator functions, or musical notes that played when the keys were pressed, for instance the Mr Mus-I-cal calculator by Concept 2000. Most kids' calculators only had

Most kids' calculators only had the four basic arithmetic functions however.

Texas Instruments (TI) seemed to be the leader in educational calculators and created many popular varieties, notably the Little Professor and Speak & Math series.

The Little
Professor
calculator by
TI first
appeared in
1976 at a
price of \$20
and was very
popular,
spawning
many clones

and different versions over the following years. Featuring the shape of a kindly old professor at the top it was engaging to use and was marketed as a serious learning tov teachers could use in the classroom for children aged 9. The between and calculator encouraged children to answer one of around 16,000 pre-programmed maths questions and responded with an 'EEE' for incorrect answer

or a new question was given with points, for a correct answer. In this respect it couldn't be used like a normal calculator. On the first versions there was a four-position switch which was used for the difficulty level and one of the four basic maths functions (+,-,/,x) had to be selected to choose the of questions presented. The user was given 3 attempts to answer the question correctly, after which the correct answer would be given.

The first three versions made in the 1970s & 1980 had an LED display and were fairly chunky. Smaller LCD display versions followed this in the 1980s. For a time in the early 80s the raised kevs were replaced by a flat membrane hut then the calculators reverted back to having the raised keys. A solar powered version was even produced in 1995.

The Little Professor is still being produced today and hasn't changed much from the original.

The Math Magic calculator was unusual in that it gave the user the opportunity to put in the question and the answer to a calculation and indicate (with flashing LED light) whether it was correct or not. The Quiz-Kid from National Semiconductor was similar to this. Both appear to have been copied in part from the Little



VINTAGE CALCULATORS



Professor which had been introduced one year earlier.

The Math Marvel by TI taught the four basic arithmetic **functions** through different games and had a buzzer to right indicate or wrong answers. The calculator used the TMS1980 chip which was also used in the TI-45 scientific calculator. A later Math Marvel version was able to speak (much like Speak & Spell but without the display). This was later developed into the Math Star calculator which looked very similar to Speak & Math.

The TI Dataman was marketed to children aged 7 and over in the late 1970s and like the **Professor** Little presented basic maths questions to be answered by the user, rather than being able to be used like a traditional calculator. It was interesting because of the effort that went in to make maths problems solving engaging. The manual describes a story of a robot called Dataman (the good guy) who has been sent on a special mission by ruler Commander

NumberFun and has to battle against evil wizard AntiMath. Even some of the keys were hexagonal shaped to give it a more futuristic and fun appearance. It seems likely that the Dataman theme was inspired by the first Star Wars film which came out at this time.

The games on Dataman included: 'Electro Flash'-where you had to solve maths problems in a set time; 'Number Guesser' where you had to guess the secret number in the fewest tries and 'Force Out' where you tried to subtract numbers to get to zero in the fewest tries.

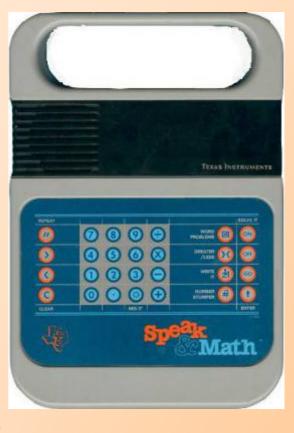
TI's most ambitious educational calculators seemed to be the Speak & Math calculators that were produced from 1980 and marketed to children aged between 6 and 12 yrs. They had VFD displays, used 4 x C sized batteries and made use of TI's advanced speech processors.

TI were one of the first companies to develop speech synthesisers in their computers and consumer electronics and the Speak & Spell/Math line of toys made full use of this technology.

Again, Speak & Math used number games to enhance learning, and could also display letter characters on the display. Games included **'Number** Stumper' which helped stimulate logical thinking and 'Greater or Less' number comparison games.

Super Speak & Math followed this in 1990 and this time used an LCD display. Games featured counting money, percentages, comparisonshopping as well as the standard maths problems.

At the time, toy calculators were bought by parents who wanted their kids to be exposed to new computing technology but wanted something smaller than a computer. The fact thay they are both cheaper than a home computer and have an obvious educational value, toy calculator games have and will continue to be popular.



VINTAGE AUDIO, TV & RADIO



'Talk your way to a shorter day' - vintage voice recorders



Voice recorders (as opposed to general sound recorders) are devices specifically made to record speech for later playback or to be typed into print. The most common device was the 'Dictaphone', the name of which originally came from the Columbia Gramophone Company in 1907.

The technology of voice recording goes back some 100 years starting with wax cylinder recorders in 1910, then to the first electronic dictation machine in 1939.

Walkie-Recordall was produced at this time and it was a portable audio recorder that recorded to a Sonoband belt. A needle etched the sound onto the Sonoband. It was originally developed as dictation machine but because of its portability and recording power, it was quickly adapted as a covert audio recorder by law enforcement and private investigators. At a cost of \$450.00, it wasn't cheap.

Similar to this was the Minifon Portable Wire Recorder, which recorded to a wire spool. Like the Walkie-Recordall, it was aimed at professionals and in respect wasn't mass marketed. The Minifon had a recording time of one hour which was very long for it's time, and came with many accessories including play" wire cassettes that would record up to five hours, telephone recording attachments, foot control, watch microphone, table leather loudspeaker, deluxe carrying body case and harness.

Devices got smaller in the 1950s with the introduction of



the Mohawk Midget Recorder, which was promoted as "The **First** World's Battery-**Operated Pocket** Tape Recorder". Measuring 8.5 x 3.5 x 1.8 inches, this was quite small for this time. It was also the first transistorised tape recorder. Prior to this time, 'portable' recorders were the size of a typewriter. The Edison Voicewriter was also 'portable', being advertised with the words 'So light... you simply tuck it under your arm like a book!'

Grundig then came on the scene in 1954 with their Stenorette machines. Magnetic tapes in reel-to-reel form were now commonly being used to record the sound. Their De Jur Portable Tape Recorder from the 1960s, marketed with the slogan 'Talk your way to a shorter day', was very popular, particular with law and enforcement agencies iournalists. Dictaphone machines however still continued to use Dictabelt records (which looked like plastic belts), to record the sound.

Devices got smaller with the Phono Trix Miniature Tape Recorder from 1965 which weighed 2.25lbs, so not quite pocket sized by today's standards. Accessories included tie clip mic, a pen mic, leather carrying case, stethoscope headphone, and amplified speaker shoulder holster.

The 1970s saw micro cassette recorders come on the market with new features such as Auto Shut off and minute tape indicators (Grundig's "Stenorette System 2000").

1980s' features included pause control, LED record and battery indicators, one touch recording, quick record/review, voice activation, end of tape warning and auto reverse. The smallest recorder in this decade appeared to be M-909 the Sony which measured 2.5 x 2 x 0.5 inches, but at \$495.00 it was marketed for professional use.

In the late 1990s digital started to recorders he

g-trun)

es than

produced and could be connected computers via USB serial ports. or Recording times were several hours long recorded and the output could be manipulated using always rep software. dealigned fo

Since their inception, voice recorders have played a useful role in the workplace and undoubtedly have made a lot of people's working day shorter!

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SACLE





The first 'personal' radios

Alongside Walkman cassette players were 'Walkman' style radios, which joined the list of new personal electronic gadgets that defined this period.

Pocket radios were nothing new, but wearing a radio on your belt clip with a pair of lightweight headphones whilst skating or cycling to work made it that much more 'personal'.

The Sony SRF-80W appeared to be one of the first such personal radios, produced in 1980. It could be attached to a large stereo loudspeaker/amplifier unit as there were no internal speakers. It was fairly advanced for the time, offering slow-motion tuning, an FM stereo decoder, mono, bass and treble switches and LED indicator.

Soon after this many personal radios were being produced. Common features included a left and right volume control and a hi-lo tone switch. Average price was around \$55 for these radios.

As it was rare to have a combined cassette player/radios, it was great that Chikuma managed to produce a miniature FM receiver that when inserted into the cassette player the user could 'play' the radio instead.

Radio watches were also produced in the early '80s. It is doubtful whether serious radio listeners were impressed by their quality, but to the gadget or even fashion

conscious, these would have been desirable.

We then see ever more features added to personal radios, namely, sound level indicators, signal and battery strength indicators, the ability to use digital presets, the inclusion of short-wave frequency, telescopic antenna and the ability to be water resistant. Some had LCD clocks or calculators built in.

Seiko produced a very unusual radio called Mr FM, which was a small radio that would attach to the user's ears with rubber hooks. In this respect, headphones were not used. It seems quite a strange radio and it's not surprising that not many were sold. In contrast, Toshiba produced the RP 2066 headset radio, which featured digital controls.

1985 seemed to mark the era of credit card sized radios. Average prices had come down now to about \$30 for a radio and for this the user may have all the features of earlier radios but perhaps with a mute control, feather touch controls, on/off switch being dropped in favour of the radio coming on when the earphone jack is plugged in and a graphic equalizer. If you waited another year, your radio could be solar instead of battery powered.

Radios since then have got lighter and smaller and more accurate with the introduction of Digital Audio Broadcast (DAB). Radio stations can be saved as 'favourites' now and tuning information

can be displayed on screen. Volume is now controlled digitally and local and DX modes of reception can be selected. \blacksquare









Will my vintage electronic collection still work in 100 years time?

You have a nice collection of vintage electronica to perhaps pass on to your grandchildren or museums of the future, but will any of it still work then, and what can you do to prolong your collection's survival?

Let's have a look at some of these threats to survival:

<u>Level of use</u>: Basically if you want something to last as long as possible – use it as infrequently as possible, but just enough to keep it ticking over.

Level of maintenance: Keeping your machines well maintained will prolong their life.

Environmental threats: Extremes of heat and cold are not good, nor a damp environment. Keep your equipment in as dry a place as possible, at an even temperature and away from air pollutants (dust, smoke etc).

Living organisms:
Rodents, insects and fungal growths will shorten the life of your machines.

How well was it designed and built in the first place? Quality made items (usually for professional use) will generally last longer than the cheaper throwaway items.

Yellowish appearance on plastic cases:

Discolouration with age. Could be from UV or fluorescent light exposure or heat exposure. Particularly susceptible are plastic cases

made with flame retardant chemicals and light as opposed to dark coloured plastics. Plastics can also become brittle with age. Manufacturers could avoid these problems by using more expensive plastics or by putting additives in the plastic mixture to reduce the effects of degradation or even adding blue pigments to neutralise the yellow. It is possible to put a UV-resistant plastic coating on top of the base plastic to help stall any yellowing.

Solder joints and wires: Solder joints and wires become brittle over time.

<u>Capacitors:</u> The weakest link in all electronics appears to be the capacitors, particularly the electrolytic types. It is unlikely that they will get to the 40-year mark let alone 100 years.

Other components:

Potentiometers, contacts and switches are also a weak link in longevity of electronics. Older resistors were not sealed very well allowing moisture to adversely affect the resistivity.

Traces on circuit boards may also lift from the heat from repeated on/off cycles over time. Again better quality construction of components makes a difference to how long they last for e.g. how tightly metal caps are crimped to carbon resistor elements, or

how well they are sealed against moisture, etc.

Transistors can either last a long time (longer than 100 years) or can wear out much sooner, but it seems hard to predict which are long lasting. If unused, semiconductors and resistors will likely to last indefinitely if they are not exposed to corrosives.

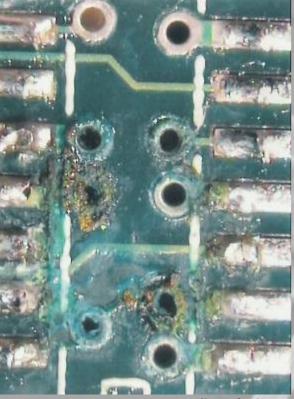
Rubber, plastic and lubricators on sealed components: e.g. electrolytic capacitors and semiconductors are likely to disintegrate before the other component parts.

Valves: Old tube equipment is very durable, and unless broken or leaky, will last indefinitely and glass is highly stable and the internal metal components protected by the vacuum. The only other threat to this is cathode emissivity reduction (see below).

Getting replacements:

Generally the longer a period of time after something has been built – the harder it is to find replacement parts when any of them fail. A lack of documentation for a particular piece of equipment will also hinder any remedying of faults etc.





Power surges/insulation problems: surges can weaken circuits. Also the insulation around wires, especially on power transformers, can get cracked, and this can spell doom for the equipment. In television sets, the high voltage section often fails as insulation degrades.

Military electronics: MIL SPEC equipment are generally of a superior and durable design to consumer electronics and it expected that such electronics will last much longer. Some these **electronics** receive special coatings and treatments to reduce environmental hazards in particular.

Tin-whisker growth: Metal whiskers consist of tiny filiform hairs on certain metals which are caused by residual either stresses caused by electroplating, mechanically induced stresses, stresses induced by diffusion of different metals and thermally induced stresses. Whiskers can cause short circuits and arcing in electrical equipment.

Zinc whiskers have been responsible for increased

system failure rates in computer server rooms. In computer disk drives they can break off and cause head crashes or bearing failures.

To remedy this it is possible to use replacement alloys for pure tin and tin/lead alloys that resist whisker growth and also oxygen-barrier coatings to prevent whisker formation.

Planned obsolescence: Planned obsolescence should really read efficient designing, i.e. a lot of electrical items were and still are designed built to last 'long enough', which could not be for very long at all. Even more so now, consumers would rather get a replacement and throw away the old or broken, than get it repaired. Part of this stems from the pace of change of technology. The broken machine after 2 years is out of date and it would cost more to repair it than buy the latest model, which is of a better spec than the broken original model. Consumers generally would not pay any more for equipment which is likely to be repairable

Batteries dying: Even the Voyager probes, which have been operating in the most extreme conditions for over thirty years, won't last for much longer. They're expected to continue working until the 'batteries' go dead, no sooner than 12 years from now.

in the future.

Lack of software or other media: Even if the hardware is still working and intact in 100 years time, you need to make sure you have any associated media/software to run on it, e.g. 8-Track tapes, Beta/VHS cassettes, LP's, Reel-to-Reel, punch cards, floppy disks etc.



emissive layers degrade slowly with time, and much quicker when the cathode is overloaded with too high current. The result is weakened emission and diminished power of the tubes. The brightness of the CRT can also be affected.

Plasma screens: The average life expectancy of today's plasma screens are up to 60,000 hours which equate to 27 years of 5-hourly TV watching per day. This is a lot longer than older plasma screens and it is expected that average life spans will increase in future.

Flash memory: e.g. computer BIOS chips, memory sticks, and memory cards. Flash memory has a finite number of erase-write cycles, after which point data will be lost.

Time will tell what eventually will survive the century mark. Most vintage electronics is not even 50 years old yet, so we will have to see how well they stand the test of time.

Vintage LED clocks



In the 1970s/80s many bedside tables were bathed in the glow of LED clocks...

LED alarm clocks changed little over the years from when they were first produced in the early 1970s. At this time features such as snooze, hourly beepers and electronic chiming sounds were considered state-of-the-art. It also seems that at first, manufacturers hadn't really put usability as a priority into clock designs. A Westclox clock from this time









used up/down slider switches on the front instead of buttons or dials, which would have made it trickier to manipulate in a hurry or at an angle whilst in bed for instance.

In the mid 1970s a normal LED clock would set you back between £30-£40 which was a fair amount back then. Clocks featured both 12-hour and 24-hour, brightness control and some had an automatic switch-off after a pre-selected period

In the late 1970s more advanced features were available such as mains failure indicator light, fast and slow set buttons, automatic brightness control and built-in reading lamps. Prices came down a lot more so the average clock cost £15 or less. Outer cases often resembled the home video consoles of the time (flat rectangular boxes with inset horizontal lines at the back of the top like an Atari VCS). Combined clock radios were popular and usually featured

two or three bands. The user could wake up to either the radio or the standard alarm.

In the early 1980s clocks often featured a protective circuit or PP3 battery backup to keep the clock on during brief power failures. Different colour LED displays were available in addition to the standard red – in particular green and blue.

A basic clock would cost around £10, a clock radio

around £20 and for £40 one could get a built-in cassette player, which could wake you up instead of the radio or standard alarm. Outer cases would either be silver or black coloured and sometimes with wood grain effect.

Some clocks had edge mounted rotary controls and also 'sensor touch' buttons were used at the time.

In the mid 1980s most clocks had 12-hour displays with am/pm indicator than 24-hour displays.

Most clocks had push buttons instead of rotary controls. Advanced features included the display of the month or date, and it was also possible to have a clock with a built-in phone. With this clock, the radio would automatically mute during a phone call.



Later on there came fancier clocks (with ever more buttons). Examples included a clock that showed Roman numerals on the display, stop

> watch clocks and clocks with multicoloured outer cases. ■



Television: The Life Story of a Technology by Alexander B Magoun

This book is part of a series of books that tell the "life story" of the objects and technologies that have become so vital to our daily lives. Each volume includes: narrative chapters that trace the history of the technology from its beginning present; suggested the reading for those interested in learning more; a timeline highlighting significant events in the development of the technology; and a glossary of technical terms used.

Tracing the history of television from its early inception through golden age,

to the current world of flat screens, cable, and satellites, Magoun provides an interesting historical survey of major inventors, companies, and influences in the life story of television technology.

Also covered is the future of television, the basic workings of this technology, the personalities and business decisions involved, and TV's impact on American values.

Readers are left with an appreciation for an old friend that they enjoyed having around, as well as recognition of the role that television has



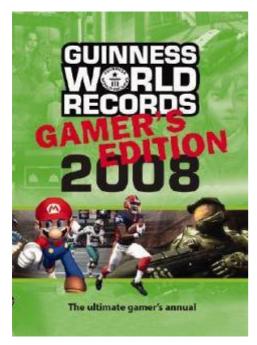
A good read, this would appeal to both the serious historian and the casual hobbyist.

Hardcover, published by Greenwood Press on June 2007; 232 pages; price £25.95/\$45 on Amazon.



An interesting offshoot of the Guinness World Records series containing not just lists of gaming records but trivia, reviews, histories, comparisons (e.g. rarest game, expensive game) tips. and Well presented with lots of colour illustrations. There are contributions from many industry experts and all platforms, genres and eras are covered.

Some facts within include:



- The Super Mario franchise is the best-selling game series of all time, having sold a total of 145 million units worldwide.
- Shigeru Miyamoto was inspired to create the Zelda series after watching Legend, director Ridley Scott's 1985 fantasy movie about a young man's quest to prevent the Lord of Darkness from destroying daylight.
- Sonic the Hedgehog was originally called "Mr. Needlemouse."
- The most successful documentary film

- about a video game is the 2007 release "The King of Kong: A Fistful of Quarters", which has so far grossed \$675,000. Directed by Seth Gordon, the film follows Steve Wiebe's successful attempt to beat Billy Mitchell's Donkey Kong score.
- Tetris is the first game to be proven to improve brain function and efficiency.

Hardcover, published by Guinness World Records Limited on Feb 2008; 256 pages, price £6.75 on Amazon.

Repairing handheld games

Before ditching a broken vintage handheld game, check out these tips to get your game working again.

Corroded contacts

battery

loosely in the battery compartment

This is usually caused by batteries being left in the game which has been unused for a long time. With the larger games using size C or D batteries. corrosion happen after a few weeks.

For minor corrosion, it should be possible to get it off with sandpaper. For heavier deposits, use hydrogen peroxide. You can either dip the contacts in the solution or use a small amount on a cotton bud or toothbrush or similar and rub the contacts with it.

An alternative solution is a mixture of baking soda and water.

If the corrosion is really bad it might be worth replacing the contacts with that from another game as they are frequently interchangeable. This might be necessary if the contacts become brittle and break off.

If the corrosion has spread to the circuit board, then it is likely that the game will never work again unfortunately!

Sometimes this is noticeable if the unit doesn't power on. Try to bend the battery contacts so that the batteries fit better in the battery compartment. Check to see whether the contacts are broken or missing and if they are, you could replace them with those from a similar game. Broken contacts can also sometimes be glued or soldered together. If the game has an AC power outlet, try using this instead of batteries.

No reaction or erratic movements when control buttons are pressed, or control buttons have to be pressed hard to work

Take the unit apart to get to where the buttons touch the metal contacts. Clean rubber pad on the underside of the buttons with a rubber pencil eraser. Also clean the part of the circuit board which button touches with rubbing alcohol.

Various commercial scratch removers for plastics and displays exist, e.g. Brasso and Meiguar's Mirror Glaze, but be careful not remove the painted markings that are part of the unit.

Special grade sandpaper (of the type usually used for plastic model kits) can also be used on plastics to smooth them.

Sticker residue can be removed easily with e.g. Goo Gone and De-Solv-It.





They may need cleaning in which case can control or tuner cleaners, residue remover sprays. cases

Scratched screens

use

just

you

TV



The best way to test for power on your game is to use a voltmeter. Check power going to the main circuit board. switch power and the transistors.

Have a look at the circuit board traces for any corrosion, breaks or damage. You could remove all the components and test them all - if they are fine then the CPU may be faulty.



Don't' overlook the obvious – double check that the batteries are fresh or if using an adapter, that this is working, plus the wall outlet. Also make sure you are using the correct batteries especially in the case of lithium batteries.

Display doesn't come on, but sound works

Have a look at the display to see if there is any breaks or holes. If this is a VFD display there isn't much that can be done to remedy this. It might also be worth replacing the power transformer for the VFD display (by using one from another game) if there are power problems. LCD screens can show black spots if broken.

If the display looks fine physically, then check to see if the unit is getting enough power (see above). If there is too much power coming to the unit than this can make the display dimmer than normal or even burn it out. If there is enough power, sometimes only the sound will work but not the display. Also check the contact/s between the display and the circuit board. Sometimes if you press the display gently in different places and you see it come on whilst doing this, then it is likely that there is a problem with the contacts on

display/circuit board. If you don't know which connection is bad, then you could try to resolder all the connections to see if this sorts the problem out.

If there are broken traces on the circuit board, you could solder some copper wire over the break to see if this helps.

Display works, but there is no sound

Check to see whether any wires leading from the speaker are disconnected and then resolder them back.

Lithium batteries have to be squeezed against the terminals to get the game working

Check to see if you have the right type of lithium battery – if it is wrong and the wrong thickness, then this will be the problem. If you are sure you are using the correct type of battery, put a piece of paper on top of the batteries between them and the compartment lid and make sure the lid can close over them without too much pressure.

General repair tips

When you re-assemble the unit after a repair job and close the outer case, make sure that no wires are caught in the wrong place.

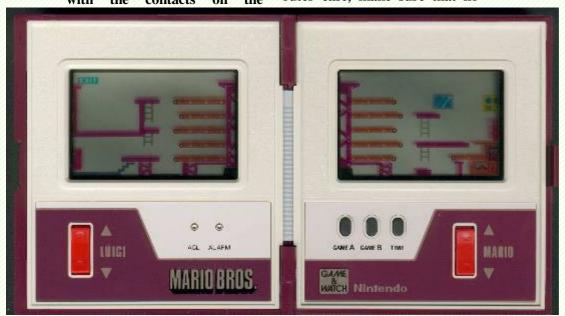
When taking a unit apart watch out you don't lose the many tiny pieces (screws, springs, buttons etc) and take good note on where things go for when you reassemble it.

Don't over tighten the screws – err on the side of making them too loose instead of too tight.

Some triangular

handhelds have shaped tamperresistant screws to put off DIYers and casual thieves. It is very difficult to obtain a screwdriver to fit these screws, but they can be bought legally online.









Digibarn computer museum





The Digibar n, which opened in July 2002, is a non-traditio

nal computer museum whose goals are to enable a 'hands on' place for visitors to boot up the systems, load their software and relive some of their past.

They are about, to quote, "capturing the artefacts in order to capture the stories". For example, when guests come they are filmed so that their emotions and reactions are recorded. Digibarn seeks to document the lives of not just the industry leaders but the

ordinary people who played a part in the computer revolution.

One of the more unusual things they have done is to plaster the walls and ceilings with 3,000 t-shirts "because the t shirt is the symbol of nerd-dom and why not surround the museum visitor with it?".

Situated very close to Silicon Valley, they are ideally placed to get many visitors who have perhaps played a significant role in recent computing history.

The exhibits include, in addition to many interesting and rare computers,



calculators, printed documentation (e.g. old advertisements and user manuals), clothing memorabilia, audio and video footage, peripheral hardware devices, clocks, radios and cameras.

Visitors need to contact the curator to arrange an appointment to visit. Go to www.digibarn.com for more information. ■



Old Computers online museum

This long standing website presents a very thorough and well-researched online collection of some 976 computers, video game consoles and pong systems.

Each system has technical information, general history and description, pictures of print adverts relating to it, peripherals images and

description, general images of the system, other web links to it, details of emulators and user discussions and input about each system.

The site also has an active collectors database and forum, plus a shop where t-shirts and other memorabilia can be bought.

The level of information coverage here appears to be unrivalled on the web at the moment. The information is also well-edited and accurate, thanks to the hard work of owners Thierry Schembri and Olivier Boisseau.

Visit www.old-computers.com for more information. ■



HP calculator memories...

"I first read of HP calculators in the early 1970s while in high school, via ads in Scientific American.

In my last year of high school (1973/4) a few affluent students had other scientific calculators which were just coming out, but these were relatively large, seemed poorly made and had no mystique whatever. When I won a graduation award, I put it towards a \$395 (Canadian) HP-35. My mother had to order it from the HP office in Vancouver (and wait several weeks for delivery), because the calculators were not sold in Canadian stores at that time.

I began collecting HP advertisements and brochures that week, starting with the 4-page HP-35 brochure (yes, those brochures are still in a box in my closet). My math teacher, Mr Denton, had just bought an HP-45, and piqued my interest by telling me that it had a 'hidden stopwatch'. So there was an HP underground!

I played with, and used, the

HP-35 daily for at least a year as a physics undergraduate. One of the professors of Physics in my first year had an he wore **HP-65**, and prominently on his belt. it demonstrating (rather smugly) to all and sundry. I bought the **HP-65** users manual, just to lust over it.

I wrote to HP for more background information, and was rewarded with back copies of the HP Journal, which are still the best sources of info on design and development issues regarding the calculators. I bought the HP-35 Math Pac, a book of programs.

By my 2nd year of university in early 1975 I really yearned for a newer HP, and bought an HP-55 from a fellow student who was selling them. My own programmable calculator! The drawback, of course, was the lack of storage. I bought various HP programs books for it. To me, the moon lander program that was so current in HP program books of the time was a noble copy of the games

programs I had seen running on minicomputers at the nuclear accelerator facility I worked at that summer.

But in 1980, at my first job, I suddenly had money and heard about the HP-41C. I quickly bought one, and then the card reader a few months later, and then the printer by that autumn. Apart from a faulty keyboard, which was replaced in 1983 or so (and which gave me the newer, more sloping, keys), it has worked flawlessly since. I contributed to the users' program library, learned about synthetic programming, and how make a battery supply using a large storage battery and adapted mains lead (my HP-41C had the side door and gold contacts for the neverproduced battery recharger). Later still. I bought the Memory Module and Functions modules.

I still have it beside me in my desk, and use it regularly for most of my calculator-based calculations.

I began to realize that my HP love was becoming old fashioned when undergraduate physics student saw me using my HP41C and said "Gee, what's that? Why are you using that big old thing?" of calculator This love technology has been imprinted on a single generation, and is never going to be repeated". By Dr. Sean F. Johnston



May 2008: Vintage technology





RADIO VINTAGE RADIO DAZE & ELECTRONICS



- Books Capacitors Of All Kinds Chassis-Aluminum/Steel
 - Chokes Custom Cloth-Covered Solid/Stranded Wire
 - Decals Dial Belts & Cord Dial Lamps & Sockets
 - Diodes Enclosures Fuses & Fuseholders Grillecloth
- Hardware Kits Knobs Potentiometers Power Cord
 - Power Pluqs Refinishing & Restoration Supplies
 - Reproduction Dial Scales
 Resistors Of All Kinds
- Service Supplies Sockets Soldering Items Speakers
 - Switches Technical Data Terminal Strips Tools
- **Transformers Classic Audio, Power, Filament, Isolation, etc.**
- **Vacuum Tubes One of the largest inventories of NOS tubes** and much, much more !!



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VINTAGE TECHNOLOGY: January 2008